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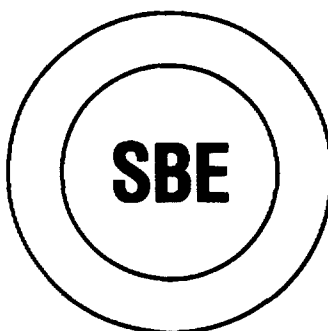
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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

**Reply Comments of the
Society of Broadcast Engineers, Inc.**

**ET Docket 95-18
Allocation of 2 GHz Spectrum for
Use by the Mobile-Satellite Service**

Third NPRM



March 5, 1999

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SOCIETY OF BROADCAST ENGINEERS, INC.
Indianapolis, Indiana

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)

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Amendment of Section 2.106 of the)
Commission's Rules to Allocate)
Spectrum at 2 GHz for Use by)
the Mobile-Satellite Service)

ET Docket No. 95-18

To: The Commission

**Reply Comments of the Society of Broadcast Engineers, Inc. to the
Memorandum Opinion and Order and Third Notice of Proposed Rule Making**

The Society of Broadcast Engineers, Incorporated ("SBE"), the national association of broadcast engineers and technical communications professionals, with more than 5,000 members in the United States, hereby respectfully submits its reply comments to the November 27, 1998¹, ET Docket 95-18 *Memorandum Opinion and Order and Third Notice of Proposed Rule Making and Order* ("Third NPRM").

Reduced Spectrum for 2 GHz BAS Is Regrettable

1A. SBE suggests that the Commission has inadequately accommodated BAS users in this proceeding. In a band that is indisputably overcrowded in all major markets in the United States, the Commission has reversed its own factual findings based on citation of one untested, conclusory report² and no additional factual investigation of its own, and has reduced the most critical Broadcast Auxiliary Service ("BAS") band by 35 MHz. The Joint Comments of Cosmos Broadcasting Corporation, Cox Broadcasting, Inc., Media General, Inc., and the Radio-Television News Directors Association ("RTNDA") and also by BST, Inc., a Local Television Transmission Service ("LTTS") provider, suggest that the Commission should have identified and allocated 35 MHz of equivalent replacement spectrum. Good spectrum management would dictate that replacement spectrum be identified and allocated, especially for such a compelling public service application, where the ability to accommodate a spectrum reallocation through reduced bandwidth is in significant question.

¹ Published in the Federal Register on December 17, 1998.

² Footnote 66 to the Third NPRM cites a February 11, 1998, report from Dr. John Payne of Nucomm Corporation to the Secretary of FCC, "Digital Video Microwave Systems for STL and ENG: Applications & Test Results."

1B. In fact, SBE has presented the FCC with ample documentation to the spectrum shortfall dating back to its comments to General Docket 82-334 (Policy for Certain Bands Between 0.947 and 40 GHz); ET Docket 94-32 (Return of Below-5 GHz Federal Spectrum to the Private Sector, which attempted to obtain 25 MHz of replacement TV BAS spectrum at 4,660–4,685 MHz); ET Docket 90-314 (Personal Communications Services, or "PCS"); ET Docket 92-9 (Redevelopment of Spectrum to Encourage Innovative Use of New Telecommunications Technologies); and Interdepartmental Radio Allocation Committee ("IRAC") Docket 30063 to codify the long standing informal sharing of 2 GHz TV BAS frequencies by the National Aeronautics and Space Administration ("NASA").

1C. Though SBE acknowledges the effect of Congress' ill-advised intervention in this proceeding by the 1997 Balanced Budget Act, there is nothing in that Act that prevented the Commission from identifying and allocating to BAS replacement spectrum below 7 GHz. Such action would provide an opportunity for displaced BAS and LTTS users to continue to provide uninterrupted, full-motion video service to the millions of television viewers who are used to seeing the product of real-time electronic news gathering ("ENG") and fully mobile point-of-view ("POV") cameras. Since the Commission has chosen not to propose any reaccommodation spectrum for displaced BAS and LTTS users, SBE has been constrained to focus its efforts on ensuring the best possible outcome for broadcasters (and for LTTS) given the forced reality of reduced bandwidth for 2 GHz TV BAS and the resulting disruption of the only band of spectrum in the U.S. allocated primarily to the production of real-time video programming which is reliably usable by cameras actually in motion, without interference or excessive foliage loss. Without adequate ENG spectrum, programming now taken for granted by the viewing public will be difficult or impossible to accomplish.

**All Reasonable and Prudent Relocation Costs Is the
Price MSS Entities Must Pay for Access to 1,990–2,025 MHz**

2A. A recurring theme in the comments of the MSS proponents is that while most³ concede that fairness and the Commission's decision require MSS entities to pay the costs associated with vacating TV Broadcast Auxiliary Services ("BAS") users from 1,990–2,025 MHz (currently, electronic news gathering ("ENG") Channels A1 and A2), these costs

³ Notable exceptions are ICO USA Service Group and Inmarsat. Indeed, the Inmarsat comments characterize the band shift as an "undeserved windfall" to broadcasters and as a "boon to BAS incumbents," and chastise broadcasters for "so inefficiently" using its present "110 MHz" (sic) of 2 GHz TV BAS spectrum. Of course, SBE disagrees with this characterization, especially since practical equipment capable of "more efficient" use is only now in the process of being developed.

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must be limited to the amount MSS entities claim to be able (or willing) to pay, as opposed to the actual costs incurred by a reasonable and prudent displaced TV BAS licensee.⁴ SBE urges the Commission to reject these arguments for two reasons: one, the MSS parties will, of course, attempt to characterize their ability to pay relocation costs to as small a dollar amount as possible, although these same MSS entities seemingly have no problem purchasing satellites, paying launch costs, and promoting MSS in a series of nation-wide television ads; and two, any arbitrary limitation on relocation costs would unjustly benefit MSS at the expense of broadcasters. The only relocation cost criteria that MSS can rightly demand is that those costs be reasonable and prudent, and the mandatory and "good faith" negotiation rules proposed by the Commission will ensure that any unreasonable or imprudent relocation cost claims, should they occur, are weeded out. If the relocation costs are more than the MSS industry is willing (or able) to pay, then they have not earned the right to the new spectrum and the new service, and, at least in the United States, that new service will not happen. This is exactly how it should be.

2B. SBE rejects the suggestion of the ICO USA Service Group⁵ that transition costs should be capped at 2% of "hard," or equipment, costs. Such a cap would be arbitrary and capricious. The only criteria that need be applied is "reasonable and prudent" to give equivalent facilities. Just as MSS parties would undoubtedly object to any proposal by broadcasters that its hard costs be automatically inflated by, say, 5% to pay for "soft" costs such as application preparation, legal fees, FCC filing fees, *etc.*, even if those fees were less than 5% of hard costs, MSS should be required to pay all reasonable and prudent soft costs. If those soft costs exceed 2% of the hard costs, so be it.

Celsat Sharing Proposal May Be Workable

3A. The ICO USA Service Group and Celsat comments raise the point that MSS parties should only be required to pay broadcasters' displacement costs "where harmful interference cannot be avoided."⁶ Celsat claims that by using "advance technology" it can share spectrum with BAS "without causing or receiving harmful interference," relying in part on "the elevation angle of Celsat's GEO satellite" and the "low operating power levels of Celsat's handsets."

⁴ ICO USA Service Group comments at Page 2

⁵ The ICO USA Service Group consists of BT North America, Inc.; Hughes Telecommunications and Space Company; Telecomunicaciones de Mexico; and TRW Inc.

⁶ ICO USA Service Group comments, at Page 6.

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3B. SBE agrees that if a MSS provider can demonstrate that its particular operations are incapable of causing interference to, or receiving interference from, co-channel BAS operations, such MSS providers should not have to share in the cost of relocating BAS incumbents. However, SBE urges the Commission to look carefully at any such claims. For example, SBE notes that the Inmarsat comments state "Compatibility studies have shown that MSS satellites will suffer from severe co-channel uplink interference resulting from the aggregate impact of multiple BAS emissions."⁷ Careful review of ICO's 3-step "sharing" plan finds that it would make two of the hallmarks of BAS frequency coordination no longer workable: channels could no longer be "loaned" or "borrowed" to relieve peak load conditions, and itinerant operation could not be done with different equipment on a market-by-market basis. In short, the ICO proposal shows either ignorance of how broadcasters already make efficient use of a too small number of 2 GHz BAS channels, or a complete disdain for the continued viability of 2 GHz ENG⁸.

3C. SBE is, however, intrigued by the Celsat comments that refer to a December 17, 1998, Celsat *ex parte* presentation. As SBE understands that Celsat presentation, Celsat's MSS handsets would be dual band units: 890 MHz cellular and 2 GHz MSS. Celsat would provide broadcasters with 2.2 GHz "keep-away" beacons operating in the MSS downlink band, 2,165-2,200 MHz. These keep-away beacons would not be an interference threat to 2 GHz TV BAS receivers because they would be transmitting in a band at least 55 MHz above the 2 GHz TV BAS band and would be low power (that is, not a brute-force overload threat to the TV BAS receiver the beacon would be protecting). Any Celsat telephone that detected a keep-away beacon would be forced to then use 890 MHz cellular frequencies rather than 2 GHz MSS frequencies. Thus, in populated areas, where coverage is available using conventional cellular radio frequencies, the Celsat MSS handsets would refrain from using shared TV BAS frequencies, because the handsets would normally be within range of one or more keep-away beacons. But, in remote areas, where there would normally be no need to restrict transmissions on a shared TV BAS frequency, as no keep-away beacon signals would be likely to be present, the handset would then be free to use a 2 GHz band frequency to ensure coverage, this time communicating via a Clarke orbit (geostationary) satellite.

⁷ Inmarsat comments, at Page 3.

⁸ SBE does not understand why ICO Service Group attached copies of product information sheets to its filing for equipment designed for fixed service use on engineered paths in 25-MHz channels on frequencies in the 7 and 13 GHz TV BAS bands, especially since one product is all digital and the other devotes more than half of the RF bandwidth to the analog signal (i.e., 15.0 MHz, or more than 12.1 MHz or even 14.3 MHz). Neither product has relevance to ENG or POV operations at 2 GHz and narrower channels.

Celsat also raised the possibility of establishing 890 MHz cellular radio microcells near 2 GHz BAS receivers where cell service is not otherwise available.

3D. Thus, unrestricted MSS operations might only be necessary on 1,990–2,010 MHz , corresponding to the worldwide MSS allocation (*i.e.*, what is now 2 GHz TV BAS Channel A1 and a portion of Channel A2). The spectrum between 2,010–2,025 MHz (*i.e.*, what is now the bulk of 2 GHz TV BAS Channel A2) could become shared MSS/TV BAS spectrum, with the MSS operating restriction cited in the previous paragraph. Therefore, broadcasters would only need to see an 20-MHz reduction in 2 GHz TV BAS bandwidth rather than a 35-MHz reduction, and rather than seven 12.1-MHz wide 2 GHz TV BAS channels, as depicted in Figure 1, there would be seven 14.3-MHz wide 2 GHz TV BAS channels, as shown in Figure 2.

3E. SBE notes that the break point must be 2,010 MHz, and not 2,008 MHz (the boundary between existing ENG Channels A1 and A2) because it is only in Region II that MSS is allocated 2,010–2,025 MHz as well as 1,990–2,010 MHz. Thus, it would make sense for Celsat, which uses fixed-in-the-sky, Clarke orbit, geostationary satellites (“GEOS”), to operate on 2,010-2,025 MHz, whereas it would not be efficient for MSS entities using moving-in-the-sky low earth orbit satellites (“LEOS”) because such platforms could only use the 2,010–2,025 MHz portion of the MSS band when over Region II (*i.e.*, North America).

3F. SBE would likely not object to a sharing of what would then become new ENG Channel A1n (2,010.000 000–2,024.285 714 MHz) and a portion of new ENG Channel A2n (2,024.285 714–2,038.571 428 MHz), if such arrangements could be worked out. Of course, this would require a change not only to the U.S. Table of Frequency Allocations, but also the concurrence of the World Administrative Radio Conference (“WARC”), and the appropriate guarantees that only dual-band MSS handsets that are keep-away beacon enabled be allowed to operate in the 2,010–2,025 MHz shared portion of the 2 GHz TV BAS band. Further, Celsat, and any other MSS provider using such a scheme, would have to agree to provide keep-away beacons for all existing 2 GHz receivers capable of operating on the Channels A1n or A2n at no charge, and agree to provide keep-away beacons for newcomer 2 GHz receivers on an actual cost, no-markup basis. In return, BAS users would need to consent to minimize use of Channel A1n where possible, especially in rural areas and with mobile receivers, and to enable the keep-away beacon only at receivers actually tuned to Channels A1n or A2n.

SBE Agrees That There Should Be a Displacement Costs Cutoff Date for New 2 GHz TV BAS Stations, but Believes That It Should Be the Release Date of the R&O to this Instant Proceeding Rather Than March 14, 1997

4A. ICO USA Service Group asks that 2 GHz TV BAS stations authorized after March 14, 1997, the date of the First R&O and Further NPRM to ET Docket 95-18, should not be entitled to "reimbursement" of relocation costs. While SBE agrees that at some point newcomer 2 GHz TV BAS licensees should no longer be entitled to relocation costs, back dating that eligibility to the date of the First R&O is unreasonable. The First R&O decided that the 2 GHz TV BAS band would be shifted upwards by 35 MHz and that only a 15-MHz net loss of 2 GHz TV BAS bandwidth would occur. Therefore, broadcasters relying on the 1997 First R&O would have purchased equipment capable of operating at 2,025–2,130 MHz and with 15-MHz wide channels. Since the now proposed allocation is 2,025–2,110 MHz for 2 GHz TV BAS, representing a loss of 35 MHz of spectrum rather than 15 MHz, and with even narrower channel widths, it is clear that back in 1997 the band plan was still a "moving target." Indeed, the band plan may still be a moving target, if the Celsat proposal described in Paragraphs 3C-3F, is adopted.

4B. SBE therefore submits that a more reasonable cutoff date would be the release date of the R&O to this instant proceeding. It will not be until that future date that the issue of reallocation frequencies will be finally decided, and accordingly all 2 GHz TV BAS licensees up to that date should be eligible for all reasonable and prudent relocation costs.

4C. Broadcasters must fund that initial, analog, equipment purchase out of their own pockets. The only reason for broadcasters to continue buying analog TV BAS hardware is because there is an existing, *bona fide* need for such equipment. If this further increases transition costs, that is MSS' problem, not broadcasters'. For this reason there should not be any limit on the date new 2 GHz TV BAS hardware was first placed into service for reallocation costs purposes. Broadcasters should not be expected to freeze equipment replacement or avoid expansion of existing systems simply to minimize the transition costs of MSS. There is no logical reason for broadcasters to rush out and buy new "existing" 2 GHz TV BAS equipment, simply to spite MSS and to artificially inflate the transition costs. The 2 GHz TV BAS band is unique in its combination of propagation characteristics, freedom from interference, and allocation for video services. There is simply nowhere else broadcasters can go on a daily basis to do their out-of-studio production. Backdating a reimbursement date would disrupt continued use of this unique service and would not be in the public interest.

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No Freeze on New 2 GHz TV BAS Licenses Is Needed

5. ICO USA Service Group and Inmarsat propose that the Commission adopt a "freeze" on all applications for new 2 GHz TV BAS licenses. Such action is unnecessary. Broadcasters should be free to bring new 2 GHz TV BAS systems on line; it is just that any such post Third R&O newcomer systems will have to bear all relocation costs themselves, when the time comes.

MSS Must Pre-Pay Transition Costs, Not Reimburse Transition Costs

6A. ICO USA Service Group argues that broadcasters that have "retunable" 2 GHz TV BAS equipment should not be eligible for "reimbursement" costs, and that broadcasters who have "set aside funds" to purchase equipment that can operate in accordance with the new band plan should also not be eligible for payment of relocation costs. First, SBE submits that the criteria should be pre-payment of relocation costs, and not "reimbursement" of relocation costs. Reimbursement requires broadcasters to tie up their investment capital by first funding the new equipment, and raises the possibility of never being reimbursed should MSS fail financially. Payment of all reasonable and prudent relocation costs up front by MSS ensures that broadcasters will not be left "holding the bag." Further, "retunable" does not necessarily mean "compatible." New channel spacing, spectrum shifts, allowance for new sharing plans that local broadcast frequency coordinators must devise, and the technical considerations outlined in the following section, are SBE's principal reasons for opposing this ICO USA Service Group argument.

6B. Second, whether a broadcaster has "set aside funds" for new band plan equipment is irrelevant, and none of MSS' business. This issue is one of basic entitlement that is clearly within both the spirit and the letter of the breakthrough balance being struck. It is not the place for MSS to decide whether a particular broadcaster can "afford" to fund new band plan equipment on its own. This would create an intolerable unbalancing of the status quo that SBE and the broadcast engineering interests SBE represents cannot tolerate.

More Than Simple Retuning of 2 GHz TV BAS Radios Will Be Required

7. Shifting to the new band plan requires more than simply retuning the channel center frequencies to the new band plan; the receiver intermediate frequency ("I.F.") bandwidths must also be changed, otherwise massive adjacent-channel interference would result. Unlike a radio's center frequency, which can be changed by installing a new crystal or perhaps simply re-programming the radio's EPROM (for synthesized, frequency-agile radios), a

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receiver's I.F. bandwidth is usually fixed to one non-adjustable value.⁹ Thus, at a minimum, new I.F. modules will be required for "modular" receivers, and entirely new receivers will be required for non-modular radios.

A Phased-In Transition Plan Will Not Work and Would Place Broadcasters at Risk Should MSS Default in Its Obligations

8A. ICO USA Service Group's comparison to the PCS model, which did not require a synchronized nationwide changeover, is flawed. PCS service was created on a market-by-market basis, by constructing a series of terrestrial PCS cells to support that new service. In contrast, MSS will use a series of low earth orbit, non-geosynchronous satellites. The whole point of that service is that it will work anywhere in the United States; indeed, anywhere in the world. Therefore, since implementation of MSS is inherently nationwide, so must be the changeover plan.

8B. For this reason SBE disagrees with ICO USA Service Group, The Boeing Company, one group of broadcasters¹⁰, and RTNDA, all of whom argue for a phased-in transition plan. Because the TV Networks and Satellite ENG ("SNG") trucks routinely travel throughout the entire country, a phased-in band shift would require such users to maintain two sets of 2 GHz TV BAS equipment. There are two other highly problematic "black hole" issues such as 1) how MSS would restrict use of MSS telephones to only those portions of the United States where broadcasters had vacated 1,990–2,205 MHz and 2) what happens if MSS fails financially before a phased-in transition scheme is completed?

8C. SBE submits that the transition plan needs to occur en masse, within as short a nationwide change over period as possible, and with MSS funding the necessary new equipment in advance. The new equipment could then be scheduled to be installed during a nation-wide transition period of perhaps 30 days. Vendors would have to provide for emergency replacement of the hopefully statistically small number of units delivered that suffer from either shipping damage or the electronic equivalent of "infant mortality." Once this date certain has been passed, MSS would have the unencumbered spectrum they need to proceed along the road to their financial reward. Broadcasters would then no longer need to worry about either the financial destiny or the financial health of the MSS industry. SBE notes that the comments of one MSS entity, Iridium LLC, also concludes that uniform, nationwide

⁹ Some radios have two bandwidth settings, "full" and "half." However, the "half" bandwidth mode would still be inappropriate for the new band plan.

¹⁰ Cosmos Broadcasting Corporation, Cox Broadcasting, Inc., and Media General, Inc.

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changeover to the new band plan is necessary.¹¹ Indeed, Iridium states that "this is a cost that MSS operators should and will be willing to bear in exchange for the guarantee of clear, unencumbered spectrum in a timely fashion as of a date certain."¹²

8D. SBE further disagrees with the comments of Cosmos Broadcasting Corporation/Cox Broadcasting, Inc./Media General Inc. and RTNDA that there are not enough tower riggers to make the change out. Microwave dishes installed on towers, and their associated waveguide transmission lines, will continue to function under the new band plan. They are broadband devices compared to individual channel bandwidths. It is the transmitters and receivers that will need to be changed out, not antennas and waveguides. And, although some 2 GHz ENG channel-specific active electronics may be mounted at height, the vast majority of 2 GHz transmitters and receivers are not.

8E. SBE also disagrees with the ICO USA Service Group claim that a gradual, phased-in transition would be possible because in the early days of MSS deployment the full 35 MHz of reallocated MSS spectrum may not be needed. SBE submits this is a "little bit pregnant" argument. Either broadcasters shift to a new band plan or they don't; to have some mish-mash of partial transitions would create chaos and would be unworkable locally or nationally. SBE must respectfully remind all parties that TV ENG and the equipment that makes it possible may be in New York one day, Los Angeles the next, and Oklahoma City the day after.

8F. SBE is not saying that it will be an easy task to swap out thousands of 2 GHz TV BAS transmitters and receivers in a short, nationwide transition period. SBE recognizes that many ENG receive sites are on mountain tops or tall buildings, and that many station technical personnel will certainly have to be isolated from other major station projects for the transition period. Indeed, it may be necessary to have new equipment in place in advance for many heavily used systems to permit a simultaneous cut over of an entire system or even a closely coordinated market without down time. Breaking news does not respect downtime. Nevertheless, SBE believes that it is inaccurate to characterize the lack of tower climbers as a reason why a nation-wide change out of 2 GHz TV BAS hardware could not occur over a relatively short time period.

A Nationwide Changeover Need Not Force Broadcasters to a Premature Adoption of Digital Technology

¹¹ Iridium LLC comments, at Page 3.

¹² Iridium LLC comments, at Page 4.

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9A. ICO USA Service Group argues that a nationwide changeover to the new band plan could force TV BAS licensees to commit to digital technology and equipment before it is necessary. SBE is amazed at concern for this possible problem by MSS entities. MSS has been quite vocal that conversion to digital is the magical cure-all to TV BAS spectrum needs, and that if broadcasters would only convert to digital, 85 MHz of 2 GHz TV BAS bandwidth would be plenty. But now comes ICO USA Service Group, which, out of its apparent deep concern for broadcasters' well being, argues that a long-term phased in transition plan would avoid forcing broadcasters into early and unwise adoption of digital hardware. And the fact that such a plan would also avoid, or at least greatly delay, MSS entities from having to pay broadcasters' relocation costs, is apparently secondary.

9B. SBE submits that the four major manufacturers of 2 GHz TV BAS equipment-- Alcatel, Harris-Farion, Microwave Radio Corporation ("MRC"), and Nucomm, could readily design modular-based hardware capable of upgrading from 12.1-MHz wide or 14.3-MHz wide reduced-deviation FM video analog systems to digitally modulated systems. The RF packages (*i.e.*, the center frequency for transmitters, and the I.F. bandwidth and center frequency for receivers) are identical under both modulation schemes. Applications where the size, weight, power draw, and the latency of digital 2 GHz TV BAS equipment would prove a problem could remain analog, and applications that can tolerate these additional requirements could be converted to digital when that equipment becomes available.

9C. SBE does agree with ICO USA Service Group's claim that MSS should be under no automatic obligation to pay the costs of converting broadcasters' 2 GHz TV BAS equipment to digital. MSS' obligation should be to fund all reasonable and prudent costs of transitioning broadcasters from the present band plan to a new band plan, with no loss in capabilities that now exist. This certainly applies to the ability to support at least two audio channels as well as the ability to use 2 GHz TV BAS transmitters on applications that are size, weight, and power consumption critical. These include, but may not be limited to, point-of-view cameras, racecar cameras, toboggan sled cameras. To the extent this conversion can be accomplished with existing analog FM video modulation, the obligation of MSS entities will have been met once new band plan analog equipment has been actually installed in broadcasters' plants. Subsequent changeover costs from analog to digital would then be at broadcasters' expense if broadcasters elect to do so.

9D. Although SBE is touched by ICO USA Service Group's concern about the burden a nationwide changeover would place on equipment manufacturers, SBE believes that those

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equipment manufacturers will manage to muddle through the demands of having to design and build and sell new 2 GHz TV BAS equipment in support of a nationwide changeover. Just as ICO USA Service Group argues that the 1997 R&O put broadcasters on notice of change coming to the 2 GHz BAS band, that same R&O put MSS parties on notice that their business plan needed to allow time for broadcasters to install new 2 GHz TV BAS equipment, once the "moving target" problem had been resolved.

The Commission Needs to Confirm that Its Rules Permit Digital Modulation in the 2 GHz TV BAS Band

10A. An issue not addressed by any of the comments is that the current FCC Rules appear not to allow digital modulation in the 2 GHz TV BAS band. Section 74.637(c) of the FCC Rules states that analog or digital modulation is allowed in the 6.5, 18, and 31 GHz TV BAS bands. By this rule section's failure to mention the 2, 2.5, 7 and 13 GHz TV BAS bands, the logical inference can only be that the FCC Rules do not permit digital modulation in these band segments. Yet all parties have been proceeding as if it were a "given" that digital modulation is permissible in the 2 GHz TV BAS band.

10B. On March 6, 1998, the Telecommunications Industry Association ("TIA") filed a Petition for Rule Making that would, among other things, modify Section 74.637 to allow digital modulation in all of the TV BAS bands. On November 16, 1998, SBE filed in support of the TIA Petition, even though it had yet to be assigned even a rule making ("RM") number. SBE pointed out the need for a change to Section 74.637(c), and urged the Commission to act on the TIA Petition forthwith. Finally, on February 9, 1999, the Commission assigned RM-9418 to the TIA Petition issued a public notice asking for comments, with a March 5 deadline. SBE will, of course, be filing comments in support of RM-9418.

10C. SBE therefore urges the Commission to use either the R&O to this instant proceeding, or the RM-9418 proceeding, to either clarify that Section 74.937(c) does not preclude digital modulation in TV BAS bands other than 6.5, 18, and 31 GHz, or, alternatively, issue a Public Notice that, pending the outcome of RM-9418, Form 313 applications requesting authority for digital modulation in the 2, 2.5, 7 or 13 GHz TV BAS bands will be granted if a showing of no interference to adjacent-channel links is provided¹³.

¹³The desired-to-undesired ("D/U") signal ratio necessary to protect adjacent-channel analog TV BAS radios, typically 0 dB for engineered paths, may not be adequate for digitally-modulated signals because of the significantly greater bandwidth occupancy a digitally-modulated, or combined analog and digitally modulated signal, can occupy, compared to conventional 17M0F9W or 25M0F9W signals, which are centered in the middle of their band and have far less spectral energy near the band edges.

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SBE notes that some Commission staff have indicated that digital modulation is not prohibited in the 2, 2.5, 7 and 13 GHz TV BAS bands, but have so far declined to put that interpretation in writing.

There Is No Apparent Reason Why 14.3 MHz Wide or 12.1 MHz Wide Analog Channels Cannot Be Made To Work, Though It May Be Expensive

11A. SBE is puzzled at the BST, Inc. comments, which insist that FM video analog feeds that currently work satisfactorily in a 17 MHz bandwidth cannot be made to work in a 12.1 MHz bandwidth. This will almost certainly require more stringent baseband filtering, and probably more tightly spaced audio subcarriers, possibly with reduced deviation as well. As long as new receivers are simultaneously installed, designed with I.F. bandwidths suitable for the new band plan and with more stringent passbands for audio subcarriers, there is no technical reason SBE is aware of why LTTS operations could not be made to work in the narrower channels. If BST has eighty existing transmitters each costing \$15,000 that would have to be replaced, then re-design those transmitters (and their associated receivers) for a 1.5 dB reduction in bandwidth and send the bill to MSS. The *quid pro quo* would have to be that MSS pre-pays for the new equipment. Absent this, 2 GHz TV BAS channels and their broadcast ENG and LTTS occupants must stay where they are now.

11B. SBE would like to point out that if the alternative band plan shown in the attached Figure 2, based on the Celsat proposal, is adopted, then the channel bandwidth reduction would decrease by only 0.75 dB. This lesser bandwidth reduction would be even less of a problem. However, SBE notes that new or modified receivers, with I.F. bandwidths of 14.3 MHz, would still be required.

11C. Indeed, SBE believes that some of the adverse impact of going to narrower bandwidth channels could be mitigated by the use of new, state-of-the-art equipment. ENG equipment that takes advantage of the latest developments in miniaturized microwave integrated circuitry ("MMIC") could significantly improve the noise figure of microwave receiver front ends. The question is not whether improvements in the state of the art for compact, solid state, microwave radios can help offset some of the adverse effects of bandwidth reduction, but whether MSS is willing to pay for the cost of new equipment.

**SBE Disagrees with NAB/MSTV that Upgrading NASA's Use of
2,025-2,110 MHz Would Regulate Broadcasters' Use To *de facto* Secondary**

12. While SBE finds itself in almost complete agreement with the joint comments of the National Association of Broadcasters ("NAB") and The Association for Maximum Service Television, Inc. ("MSTV"), there is one area where SBE disagrees with NAB/MSTV: SBE does not believe that the proposed changes to NASA's use of 2,025-2,110 MHz would relegate broadcasters to secondary users. NAB/MSTV's concern appears to focus on the "high density" prohibition contained in the proposed new Footnote USXXX to Section 2.106 of the FCC Rules. However, SBE's understanding of "high density" are systems like cellular radio and PCS, with hundreds of thousands of transmitters (*i.e.*, cellphones) and thousands of cells (*i.e.*, base stations). This is not the present ENG model, nor does SBE envision such a multi-order of magnitude increase in the number of 2 GHz TV BAS transmitters. Even concentrations of ENG transmitters at a major news, sporting, or political event does not constitute "high density" use. Therefore, SBE disagrees with NAB/MSTV on this one issue, and does not see the proposed changes to the U.S. Table of Frequency Allocations as a *de facto* relegation of 2 GHz TV BAS operations to secondary status.

**SBE Applauds NAB/MSTV's 2 GHz Facilities Evaluation Update and
Walt Disney Company's Report on Digital ENG Applications**

13A. Included in the NAB/MSTV comments is an updated evaluation of the number and type of 2 GHz TV BAS facilities currently used by broadcasters (including broadcast network entities). SBE commends NAB for undertaking this updated survey, which provides critical information to both the FCC and to certain vocal MSS entities about the existing number of 2 GHz TV BAS facilities, in support of relocation cost calculations.

13B. SBE also applauds the efforts of the Walt Disney Company in having its Imagineering Research & Development subsidiary undertake a series of tests on the viability of digitally-modulated 2 GHz transmitters, receivers, and codecs. The report demonstrates encouraging results, while establishing that practical digital ENG equipment is probably two generations, and at least a year, away.

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Summary

14. A nationwide rather than a phased-in changeover to the new band plan is necessary. This changeover must be funded in advance by the MSS industry. If the MSS industry is unwilling or unable to do so, then implementation of MSS in the United States should not happen.

List of Figures

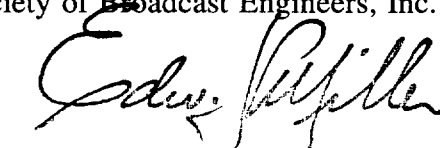
15. The following figures or exhibits have been prepared as a part of these SBE reply comments:

1. Figure showing existing versus Option A (12.1-MHz wide channels) 2 GHz TV BAS band plans.
2. Figure showing existing versus Option B (14.3-MHz wide channels) 2 GHz TV BAS band plans.

Respectfully submitted,

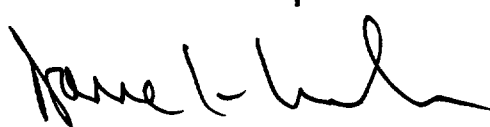
Society of Broadcast Engineers, Inc.

By



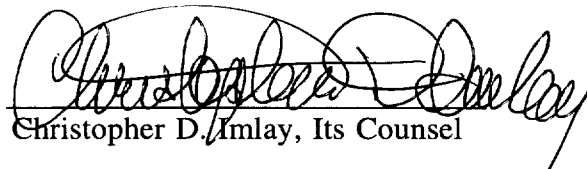
Ed Miller, CPBE, President

By

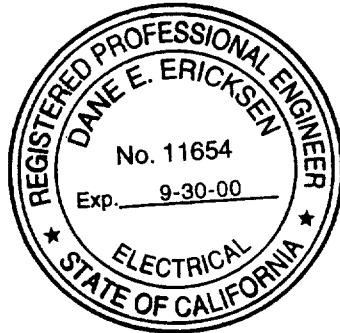


Dane E. Ericksen, P.E., CS RTE
Chairman, SBE FCC Liaison Committee

By



Christopher D. Imlay, Its Counsel



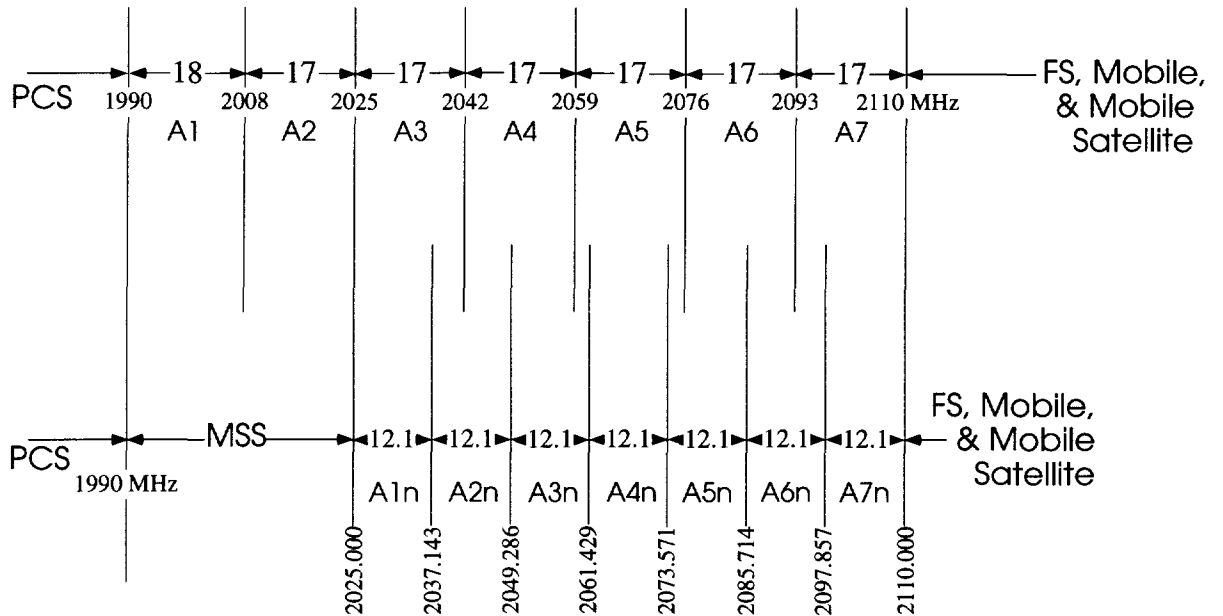
March 5, 1999

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202/686-9600

SBE Comments to ET Docket 95-18 Third NPRM

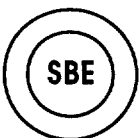
Existing v. Proposed 2 GHz BAS Band Plan OPTION A

Existing Band Plan



New Band Plan - Option A

All frequencies and bandwidths are in MHz.



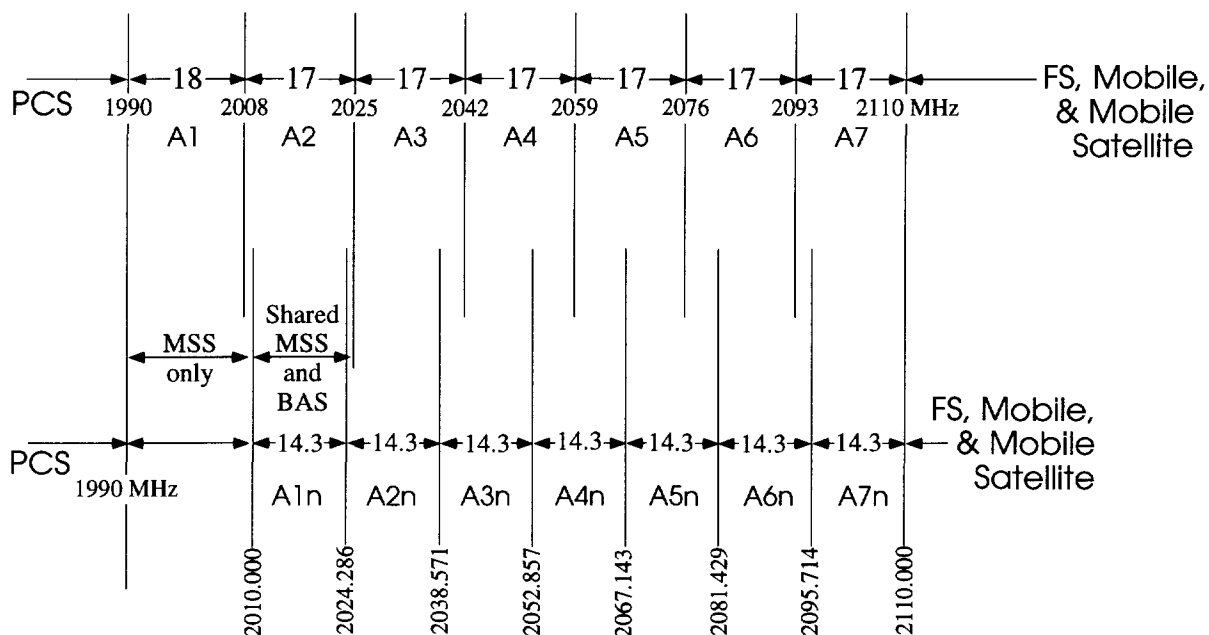
SOCIETY OF BROADCAST ENGINEERS, INC.
Indianapolis, Indiana

990215
Figure 1

SBE Comments to ET Docket 95-18 Third NPRM

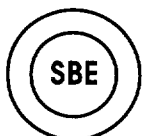
Existing v. Proposed 2 GHz BAS Band Plan OPTION B

Existing Band Plan



New Band Plan - Option B

All frequencies and bandwidths are in MHz.



SOCIETY OF BROADCAST ENGINEERS, INC.
Indianapolis, Indiana

990215.2
Figure 2

CERTIFICATE OF SERVICE

I, Judith L. Wing, do hereby certify that copies of the foregoing REPLY COMMENTS OF THE SOCIETY OF BROADCAST ENGINEERS, INC., were served this 5th day of March, via first class mail, postage prepaid, upon the following:

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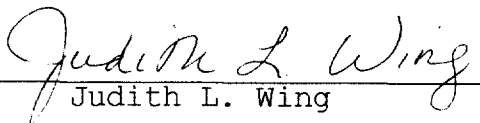
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